

## CLAIMS

- 1 Apparatus for providing synchronization signals to a telecommunications network comprising:
- 2
- 3 a central synchronization management unit for distributing synchronization signals, and
- 4 a synchronization distribution unit connected to receive synchronization signals from
- 5 the central synchronization management unit and to distribute the signals to at least
- 6 one network element.
- 1 2. The apparatus of claim 1 wherein the synchronization signals are optical signals.
- 1 3. The apparatus of claim 2 wherein the central synchronization management unit comprises:
- 2 an input port for receiving a clock signal, and
- 3 an optical processor for producing optical clock signals.
- 4 4. The apparatus of claim 3 wherein the central synchronization management unit further comprises:
- 5 a processor for retiming clock signals received at said input port.
- 6 5. The apparatus of claim 4 wherein the input port is equipped to receive clock signals from a plurality of clock sources.
- 1 6. The apparatus of claim 5 wherein the central synchronization management unit selects
- 2 one of a plurality of input clock signals as a primary clock output signal.
- 1 7. The apparatus of claim 6 wherein the central synchronization management unit
- 2 produces a plurality of optical clock output signals.

8. The apparatus of claim 2 wherein the synchronization distribution unit comprises:  
a passive optical input port configured to receive an optical clock signal and to split the optical clock signal into two signals, routing one of the split signals to an optical output.

9. The apparatus of claim 8 wherein the synchronization distribution unit further comprises:  
an active optical input port configured to receive an optical clock signal; and  
a clock recovery system configured to perform clock recovery on an optical clock signal received at either the active or passive optical input port.

10. The apparatus of claim 9 wherein the clock recovery system is configured to receive optical clock signals from said active optical input port and from said passive optical input port and to perform clock recovery on an optical clock input from a selected one of the active and passive optical input ports.

11. The apparatus of claim 10 wherein the synchronization distribution unit further comprises an alarm and optical system processor for determining which one of signals received from the active and passive optical input ports to perform clock recovery on.

12. The apparatus of claim 11 wherein the synchronization distribution unit further comprises electronic output drivers for converting an optical signal upon which clock recovery has been performed into an electronic clock output signal for provision to a telecommunications network element.

13. The apparatus of claim 10 wherein the synchronization distribution unit includes passive and active optical output ports, the active output port being configured to receive the optical clock signal upon which clock recovery has been performed, the passive optical output port being configured to receive the optical clock signal split at the passive optical input port and routed to an optical output

1 14. The apparatus of claim 10 further comprising a second synchronization distribution  
2 unit connected in series with the synchronization distribution unit connected to  
3 receive synchronization signals from the central synchronization management unit,  
4 the second synchronization distribution unit configured to receive synchronization  
5 signals from the synchronization distribution unit connected to receive  
6 synchronization signals from the central synchronization management unit.

1 15 The apparatus of claim 14 wherein synchronization distribution units connected in  
2 series are cross-coupled, such that the active output of an upstream synchronization  
3 distribution unit is coupled to the passive input port of the next downstream  
4 synchronization distribution unit in the series and the passive output of the upstream  
5 synchronization distribution unit is coupled to the active input port of the next  
6 downstream synchronization distribution unit in the series.

16 A method of distributing synchronization signals in a telecommunications office  
comprising the steps of:  
(a) recovering a clock signal at a central synchronization management unit, and  
(b) retiming the clock signal from the central synchronization management unit and  
distributing it over an optical link to a synchronization distribution unit, and  
(b) transmitting the clock signal from the synchronization distribution unit to a  
telecommunications network element.

1 17. The method of claim 16 wherein a plurality of clock signals are received at a central  
2 synchronization management unit in step (a) and one of them is selected by the  
3 central synchronization management unit for supply to the synchronization  
4 distribution unit.

1 18 The method of claim 17 wherein the central synchronization management unit  
2 produces two clock output signals from the selected one of the plurality of clock  
3 signals received by the central synchronization management unit in step (a), and  
4 transmits one of the clock output signals over an optical link to an active input port  
5 of the synchronization distribution unit and transmits the other of the clock output  
6 signals over an optical link to a passive input port of the synchronization distribution  
7 unit.

1 19. The method of claim 18 further comprising the step of selecting by an  
2 synchronization distribution unit of one of the passive and active optical input clock  
3 signals to transmit to a network element.

4 20. The method of claim 19 wherein the selected clock signal is converted from an  
5 optical to an electrical signal before transmission to the network element.

6 21. The method of claim 20 wherein a plurality of synchronization distribution units are  
7 connected in series, with the passive output port of an upstream synchronization  
distribution unit coupled to the active input port of a downstream synchronization  
distribution unit and the active output port of an upstream synchronization  
distribution unit coupled to the passive input port of a downstream synchronization  
distribution unit, each synchronization distribution unit performing clock recovery on  
the synchronization signal received at its active input port.